PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	**Eugene Pikus, David Nohre**
Application No.:	**10/733499**
Filed:	**December 10, 2003**
For:	**RF DATA COMMUNICATIONS LINK FOR SETTING ELECTRONIC FUZES**
Examiner:	**Michelle Renee Clement**
Group Art Unit:	**3641**

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Docket No.: A39.2B-11304-US01

APPEAL BRIEF

This is an Appeal Brief for the above-identified Application in which claims 1-18 and 21-26 were rejected in the Final Office Action mailed August 21, 2007. A Notice of Appeal was filed in this case on November 20, 2007.

This brief is submitted in accordance with 37 CFR. § 41.37. The fees required under 37 CFR § 41.20, and any petition for an extension of time required for filing this brief, are addressed in the accompanying Transmittal Letter.

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(i) Real Party in Interest

The application is assigned to Alliant Techsystems Inc., 5050 Lincoln Drive, Edina, MN 55436.

(ii) Related Appeals and Interferences

No related appeals or interferences are pending.

(iii) Status of Claims

Claims 1-18 and 21-26 are pending in this application. Claims 19 and 20 have been cancelled.

Claims 1-18 and 21-26 stand rejected and are the subject of this appeal. Specifically, the Final Office Action rejected claims 1-14, 16-18 and 21-24 under 35 USC § 103 over Cumming (US 4144815) in view of Keil (US 6176168); and rejected claims 15, 25 and 26 under 35 USC § 103 over Cumming in view of Keil and further in view of Koerner (US 4495851).

(iv) Status of Amendments

A Response After Final was filed on October 22, 2007, subsequent to the Final Office Action, which presented arguments but did not amend the claims. The claims have not been amended subsequent to the Final Office Action.

(v) Summary of Claimed Subject Matter

Independent claim 1 recites a system for programming a fuze comprising a fuze 20 having a power receiver 28 and a data receiver 22, and a fuze setter 12 having a power transmitter 18 and a data transmitter 14. See Figure 3; page 5, lines 11-14; and page 6, lines 28-30. Operational power for the fuze is inductively transmitted 26 from the power transmitter 18 to the power receiver 28, and pre-launch fuze setting data is transmitted from the data transmitter 14 to the data receiver 22 via an electromagnetic signal 10 selected from a group consisting of the infrared, RF, visible and UV bands of the electromagnetic spectrum. See Figures 3 and 4; page 5, lines 21-27; and page 6, line 31-page 7, line 9.

Dependent claim 3 specifies that the fuze 20 comprises a data transmitter 22 having an antenna 52. See Figure 3 and 6, and page 8, line 31-page 9, line 4. The fuze setter 12 comprises a data receiver 14 and the setting data 10 received by the fuze 20 is verified by a reverse transmission 10a from the fuze data transmitter 22 back to the fuze setter data receiver 14. See Figure 3; page 6, lines 1-6 and 19-27.

Dependent claim 4 specifies that the data transmitter 14 is within 6 inches of the data receiver 22. See page 10, lines 18-21.

Independent claim 5 recites a system for programming a fuze comprising a fuze 20 comprising a power receiver 28 and a radio frequency data receiver 22, and a fuze setter 12 comprising a power transmitter 18 and a radio frequency data transmitter 14. See Figure 3; page 5, lines 11-14 and 30-33; and page 6, lines 28-30. Operational power for the fuze 20 is inductively transmitted 26 from the power transmitter 18 to the power receiver 28, and pre-launch fuze setting data is transmitted from the radio frequency data transmitter 14 and received by the radio frequency data receiver 22. See Figures 3 and 4; page 5, lines 21-22 and 30-33; and page 6, line 31-page 7, line 9.

Dependent claim 6 specifies that the radio frequency data receiver of the fuze 20 comprises a radio frequency transceiver 22, and that the radio frequency data transmitter of the fuze setter 12 comprises a radio frequency transceiver 14. See Figure 3 and page 6, lines 1-6.

Dependent claim 7 specifies that a talkback signal 10a is sent from the fuze transceiver 22 to the fuze setter transceiver 14 to verify the setting data. See Figure 3 and page 6, lines 19-27.

Dependent claim 11 specifies that the data transmitter 14 is within 6 inches of the data receiver 22. See page 10, lines 18-21.

Dependent claim 15 specifies that the operational power 26 and the pre-launch fuze setting data 10 are transmitted simultaneously. See Figures 3 and 4.

Dependent claim 16 specifies that the reverse transmission 10a comprises a radio signal. See Figure 3 and page 6, lines 1-6.

Dependent claim 17 specifies that the operational power 26 and the pre-launch fuze setting data 10 are transmitted simultaneously. See Figures 3 and 4.

Independent claim 21 recites a method of setting a projectile fuze comprising

providing a fuze 20 comprising a power receiver 28 and a radio frequency data receiver 22, and providing a fuze setter 12 comprising a power transmitter 18 and a radio frequency data transmitter 14. See Figure 3; page 4, lines 5-8; page 5, lines 11-14 and 30-33; and page 6, lines 28-30. The power transmitter 18 comprises an inductive coil 18a. See Figure 4; and page 7, lines 4-9. The radio frequency data transmitter 14 comprises an antenna 52. See Figure 6; and page 8, line 31-page 9, line 4. The method further comprises transmitting operational power for the fuze 20 from the power transmitter 18 to the power receiver 28 via an inductive signal 26, and transmitting fuze setting data from the radio frequency data transmitter 14 to the radio frequency data receiver 22 via a radio signal 10. See Figures 3 and 4; page 5, lines 21-22 and 30-33; and page 6, line 31-page 7, line 9.

Independent claim 24 recites a system for programming a fuze comprising a fuze 20 comprising a power receiver 28 and a data receiver 22, and a fuze setter 12 comprising a power transmitter 18 and a data transmitter 14. See Figure 3; page 5, lines 11-14; and page 6, lines 28-30. The power transmitter 18 comprises an inductive coil 18a. See Figure 4; and page 7, lines 4-9. The power transmitter 18 transmits an inductive power carrier signal 26. See page 6, line 31-page 7, line 3. The data transmitter 14 transmits an electromagnetic signal 10 comprising pre-launch fuze setting data, and the data receiver 22 receives the electromagnetic signal 10. See Figure 3; and page 5, lines 21-22 and 30-33.

(vi) Grounds of Rejection to be Reviewed on Appeal

Issue 1: Whether the Examiner erred in rejecting claims 1-14, 16-18 and 21-24 under 35 USC § 103 over Cumming (US 4144815) in view of Keil (US 6176168).

Issue 2: Whether the Examiner erred in rejecting claims 15, 25 and 26 under 35 USC § 103 over Cumming in view of Keil and further in view of Koerner (US 4495851).

(vii) Argument

<u>Issue 1: Whether the Examiner erred in rejecting claims 1-14, 16-18 and 21-24 under 35 USC § 103 over Cumming (US 4144815) in view of Keil (US 6176168).</u>

The Examiner erred in rejecting claims 1-14, 16-18 and 21-24 under 35 USC § 103 over Cumming in view of Keil because a person of ordinary skill in the art would not have been motivated to make the combination proposed in the rejection absent an impermissible hindsight use of Applicants' disclosure. Further, the proposed combination does not have a reasonable expectation of success. Therefore, a *prima facie* case of obviousness has not been established.

Independent claim 1 recites a system for programming a fuze comprising a fuze 20 and a fuze setter 12. The fuze 20 comprises a power receiver 28 and a data receiver 22. The fuze setter 12 comprises power transmitter 18 and a data transmitter 14. Power is transmitted <u>inductively</u> from the power transmitter 18 of the fuze setter 12 to the power receiver 28 of the fuze 20. Fuze setting data is transmitted from the data transmitter 14 of the fuze setter 12 to the data receiver 22 of the fuze 20 via an <u>electromagnetic signal</u>. See e.g. Figure 3 below.

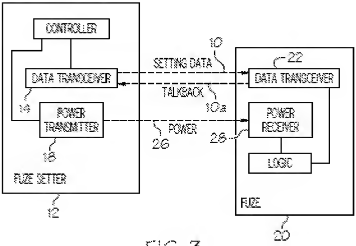


FIG. 3

Independent claim 5 is similar to claim 1, but specifies a "radio frequency data transmitter" and a "radio frequency data receiver."

Independent claim 24 is similar to claim 1, but specifies that the power transmitter comprises an inductive coil.

Independent claim 21 is directed to a method of setting a fuze comprising

providing a fuze and a fuze setter, transmitting power via an inductive signal and transmitting setting data via a radio signal. Claim 21 also includes limitations directed to an inductive coil, a radio frequency data transmitter and a radio frequency data receiver.

The claimed system/method allows for faster fuze powering and programming than would be possible with the methods taught in the applied references. For example, Applicants discuss the Keil method, which transmits both power and setting data in a single modulated inductive signal, as will be discussed below. Applicants teach that newer fuzes, such as those capable of using GPS, require too much data to be programmed within desirable time constraints using the modulated inductive signal. See page 2, lines 19-25. Applicants then teach the claimed system/method, which combines efficient power transfer via an inductive signal with efficient data transfer via an electromagnetic/radio signal.

Applied References

Cumming (US 4144815) teaches a system that transmits both power and setting data to a fuze via a microwave signal while the fuze is chambered in a gun barrel. See abstract and Figure 1, provided below.

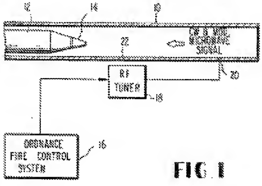


FIG. 1

The system uses a probe 20 to penetrate the gun barrel 10, and the inner wall of the gun barrel 10 acts as a waveguide that guides the microwave energy to the fuze 14. See column 2, lines 21-25. The microwave energy includes an initial continuous-wave signal followed by a modulated carrier signal. See column 2, lines 57-66. The initial CW signal is converted to DC voltage for power, and the modulated signal carries setting data. See column 3, lines 8-26.

Keil (US 6176168) teaches an alternative system that uses inductive coils and transmits both power and setting data to a fuze via an inductive signal. A transmitter coil 24

generates the inductive signal, which is received by a receiver coil 14 in the fuze. See e.g. Figure 1.

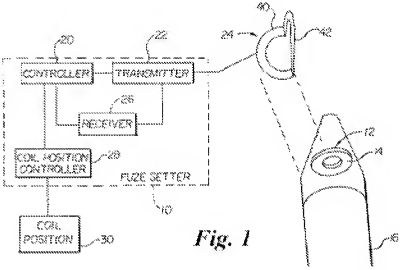
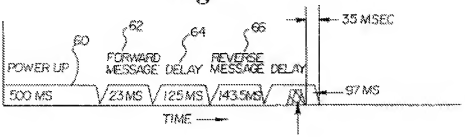


Fig. 1

The inductive signal includes a power up phase 60 and a modulated forward message phase 62 that includes the setting data. Keil is also capable of receiving a "talkback" signal 66 from the fuze, wherein the receiver coil 14 in the fuze transmits data back to the transmitter coil 24 in the setter to verify the setting data. See Figure 7, provided below, and column 4, lines 16-31.

Fig. 7



Thus, Cumming and Keil teach alternative devices and methods for achieving a similar result – powering and setting a fuze. Cumming accomplishes the task using a modulated <u>microwave signal</u> and equipment that is constructed and arranged to send, receive and interpret the modulated microwave signal. Keil accomplishes the task using a modulated <u>inductive signal</u> and equipment that is constructed and arranged to send, receive and interpret the modulated inductive signal.

Motivation to Combine

The rejection proposes to "combine the talkback features, the inductive operational power transmission, and digital-to-analog converters as suggested by Keil et al. with the system as taught by Cumming et al., since the operation of one element is in no way dependent on the operation of the other element and the various signals could be used to achieve the predictable result of transmitting more information." See Final Office Action at page 4.

Although the rejection proposes a combination/modification to the prior art, the specific modification is not clear. The rejection discusses communication between a fuze and fuze setter in the abstract, but does not address practical considerations and the physical structures that would be required if the proposed modification were actually reduced to practice. Cumming and Keil communicate with a fuze in different ways – Cumming with a modulated microwave signal and Keil with a modulated inductive signal. Although the rejection proposes to use both microwave communication and inductive communication, it does not discuss how the original Cumming and Keil signals would be changed in order to be used together. Applicants' claims specify that power is transmitted by inductive signal and setting data is transmitted by electromagnetic or radio signal – thus, the rejection must satisfy these limitations. However, the fact that Applicants' claims must be reviewed in order to understand the specific content of the rejection is evidence that the rejection stems from an impermissible hindsight use of Applicants' disclosure.

A person of ordinary skill in the art would recognize that Cumming and Keil teach alternative solutions for a similar problem – powering and setting a fuze.

Cumming, a reference from 1979, teaches a specific method of using a modulated microwave signal to provide both power and setting data to a fuze. The equipment is specifically configured to be capable sending/receiving the modulated microwave signal. It should be noted that the Cumming method requires the projectile/fuze to be oriented in the gun barrel during powering and programming. See e.g. column 1, lines 59-61 and column 2, lines 6-8.

Keil, a reference from 2001, represents an advance in the technology of fuze programming over the Cumming method. Keil uses a modulated inductive signal to provide both power and setting data. The equipment is specifically configured to be capable sending/receiving

the modulated inductive signal. A person of ordinary skill in the art would recognize a general benefit to the safety and health of personnel in transmitting a given amount of energy via an inductive signal when compared to transmitting a similar amount of energy by microwave. Keil further teaches a reverse "talkback" communication to verify the setting data, and that the Keil method programs the fuze prior to positioning in the gun barrel, allowing a firing rate of 10 rounds per minute. See e.g. Figure 4 and column 2, lines 46-51. A person of ordinary skill in the art would recognize that programming a fuze outside of the gun barrel allows for a higher firing rate because a second shot can be programmed while a first shot is being loaded in the barrel and fired.

If a person of ordinary skill in the art were presented with the teachings of Cumming and Keil, they would <u>not</u> be motivated to dissect each reference and combine the teachings as asserted in the rejection. Instead, they would recognize that Cumming and Keil teach alternative methods for achieving a similar result, but Keil provides the additional benefits of a talkback verification signal and a higher firing rate. Therefore, a person of ordinary skill in the art would simply opt to use the Keil method, rather than attempting to build a redundant system having both the Keil inductive communication equipment and the Cumming microwave communication equipment.

The rejection states that the proposed modification would allow "transmitting more information." This statement appears to be the only motivation asserted for performing the proposed modification. Applicants have interpreted the statement as an assertion that the proposed modification would result in a time benefit over either prior art method - i.e. faster programming. The statement is traversed.

The mere combination of the Cumming signal with the Keil signal would not, alone, provide any time benefit over either prior art method. The rejection does not propose any modification to the modulated signals being transmitted from the fuze setter to the fuze. A person of ordinary skill in the art would recognize that both signals include power and setting data. Thus, the two signals would be completely redundant if used to program the same fuze. If the Cumming modulated microwave signal and the Keil modulated inductive signal were both transmitted to the fuze, each signal would take the same amount of time as it did in the original Cumming or Keil reference. Therefore, the proposed combination does <u>not</u> present any time

benefit over the prior art, and the rejection does not present an actual motivation to make the proposed combination/modification.

Applicants teach a benefit to transmitting power via induction and setting data via electromagnetic/radio signal – namely faster setting times. The rejection cannot achieve this benefit, as the prior art methods commingle power and setting data in a single signal. In order for a modification of Cumming and Keil to achieve a similar time benefit, the commingled signals taught by each must be dissected into component parts, and certain components from each reference would have to be used. For example, Cumming's microwave signal must be modified to remove the initial CW signal, leaving only the setting portion of the signal. Keil's inductive signal must be modified to remove the modulated setting portion, leaving only the power up phase. The dissected signals would then have to be used together, along with modified equipment capable of receiving both types of signals. The rejection provides absolutely no motivation to dissect the references and combine component parts in this way. Further, any proposal to modify the prior art in such a way stems from an impermissible hindsight use of Applicants' disclosure.

Therefore, Applicants assert that the rejection does not provide a motivation to combine Cumming and Keil as proposed by the Examiner, and that the prior art does not suggest the desirability of the claimed invention. For at least these reasons, the rejection does not present a *prime facie* case of obviousness against the rejected claims.

Expectation of Success

A rejection under 35 USC § 103 that modifies or combines prior art teachings must present a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants assert that the modification proposed in the rejection does not have a reasonable expectation of success because the prior art does not teach a fuze capable of receiving and deciphering duplicative powering and setting signals.

Cumming teaches a modulated microwave signal that powers a fuze and provides setting data. The setting device is capable of creating and transmitting the modulated microwave signal, and the fuze is capable of receiving the modulated microwave signal and deciphering the setting data.

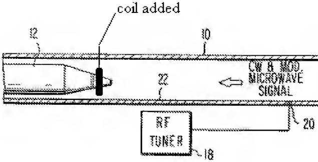
Keil teaches an alternative modulated inductive signal that powers a fuze and provides setting data. The setting device is capable of creating and transmitting the modulated inductive signal, and the fuze is capable of receiving the modulated inductive signal and deciphering the setting data.

The rejection proposes to "combine…the inductive operational power transmission…as suggested by Keil et al. with the system as taught by Cumming et al." See Final Office Action at page 4. As discussed above, Applicants assert that the rejection does not provide any motivation to dissect either modulated signal into component parts, absent an impermissible hindsight use of Applicants' disclosure. Thus, the combination proposed in the rejection would have a redundant signal transmission – both the Cumming microwave signal and the Keil inductive signal would include power and modulated setting data.

Although Cumming teaches a fuze capable of interpreting modulated data received over a microwave signal and Keil teaches a fuze capable of interpreting modulated data received over an inductive signal, neither reference teaches a fuze capable of interpreting duplicative data received from both an inductive signal and a microwave signal. Thus, even if a person of ordinary skill in the art built a fuze having components from both Cumming and Keil, the rejection provides no guidance as to how the fuze would actually receive and interpret both signals. In either prior art method, the fuze receives a single signal that is specifically configured to allow the fuze to understand the setting data. Simply building a fuze with an inductive coil and a microwave antenna does not enable the fuze to interpret setting data from multiple sources simultaneously. A person of ordinary skill in the art would further recognize that the multiple signals could interfere with one another, causing errors in the data interpretation. For example, the physical reception of the second modulated signal could generate voltages in various circuits within the fuze that could cause errors in interpreting the data contained in the first modulated signal.

The proposed combination also presents practical compatibility issues that are not addressed by the rejection. A person of ordinary skill in the art would recognize that a transmitter coil must be located in proximity to the fuze's receiver coil for the inductive signal to be conveyed between the coils. Because Cumming uses the gun barrel as a waveguide and only transmits the microwave signal to a fuze positioned in the gun barrel, the transmitter coil would also have to be placed within the gun barrel, for example as shown below in a marked version of Cumming Figure

1.



A person of ordinary skill in the art would not position a transmitter coil within the Cumming gun barrel because gun barrels generally must be free of such obstructions. If the projectile is accidentally fired when the transmitter coil is in a programming position, essential components of the setting system would be destroyed, and the launch platform (e.g. a tank) would be rendered inoperable. Gun barrels are also manufactured to exact tolerances, and the insertion/placement of the coil and removal of the coil would present additional drawbacks. Further, since Cumming requires the projectile to be positioned in the gun barrel during programming, other projectiles cannot be fired while the projectile is being programmed. The Keil device, being separate from the gun barrel, is capable of programming one fuze while another projectile is being fired. This additional benefit of efficiency would be negated by the proposed combination.

Therefore, Applicants assert that the rejection does not include a reasonable expectation of success, and that a *prima facie* case of obviousness has not been presented against the rejected claims.

Accordingly, Applicants request that the Board reverse the rejection of claims 1-14, 16-18 and 21-24 under 35 USC § 103 over Cumming in view of Keil.

<u>Dependent Claim 3</u>

Claim 3 requires that "the fuze comprises a data transmitter having an antenna" and that "the setting data received by the fuze is verified by a reverse transmission from the fuze data transmitter back to the fuze setter data receiver."

Applicants have distinguished claim 3 from the "talkback" function of the Keil

reference by reciting the "antenna." Keil uses an inductive signal to perform the talkback function, and therefore uses an inductive coil, not the claimed antenna.

The rejection admits that Cumming does not teach a talkback signal. See Final Office Action at page 3. Therefore, the applied references do not disclose or suggest a talkback signal sent via antenna. Even if the combination proposed in the rejection were performed, the resulting modified fuze would use Keil's inductive talkback method, and would not meet the limitations of claim 3. Therefore, Applicants assert that claim 3 is patentable over Cumming in view of Keil, and request that the Board reverse the rejection of claim 3.

Dependent Claim 4

Claim 4 requires the data transmitter to be "within 6 inches of the data receiver." Claim 4 distinguishes over Cumming, which places the data transmitter (RF injector probe 20) in the gun barrel spaced away from the projectile. See e.g. Cumming Figure 1.

Even if the proposed modification were performed, there is no teaching that the claimed data transmitter would be within 6 inches of the data receiver, as required by claim 4. Further, from Cumming Figure 1, it appears that the RF injector probe 20 would be positioned farther than 6 inches away from the fuze. Therefore, Applicants assert that claim 4 is patentable over Cumming in view of Keil, and request that the Board reverse the rejection of claim 4.

Dependent Claim 6

Claim 6 recites, "wherein the radio frequency data receiver of the fuze comprises a radio frequency transceiver; and the radio frequency data transmitter of the fuze setter comprises a radio frequency transceiver."

The applied references do not disclose or suggest a radio frequency transceiver. The Examiner asserts that Cumming teaches radio frequency transceivers in both the fuze and fuze setter – see Final Office Action at page 3, however, Cumming only teaches one-way communication from the fuze setter to the fuze. Thus, Cumming teaches a transmitter associated with the fuze setter and a receiver associated with the fuze. Neither Cumming nor Keil discloses or suggests a radio frequency transceiver, as required by claim 6. Therefore, Applicants assert that claim 6 is patentable over Cumming in view of Keil, and request that the Board reverse the

rejection of claim 6.

Dependent Claim 7

Claim 7 depends from claim 6 and further recites a "talkback signal" sent from the fuze transceiver to the fuze setter transceiver. Applicants have asserted above with respect to claim 6 that the applied references do not teach a radio frequency transceiver. Applicants further assert that the applied references do not disclose or suggest a talkback signal sent by radio frequency.

Keil teaches talkback via an inductive signal. The rejection admits that Cumming does not teach a talkback signal. See Final Office Action at page 3. Therefore, the applied references do not disclose or suggest a talkback signal sent via a radio frequency transceiver. Even if the combination proposed in the rejection were performed, the resulting modified fuze would use Keil's inductive talkback method, and would not meet the limitations of claim 7. Therefore, Applicants assert that claim 7 is patentable over Cumming in view of Keil, and request that the Board reverse the rejection of claim 7.

Dependent Claim 11

Claim 11 requires the data transmitter to be "within 6 inches of the data receiver." Claim 11 distinguishes over Cumming, which places the data transmitter (RF injector probe 20) in the gun barrel spaced away from the projectile. See e.g. Cumming Figure 1.

Even if the proposed modification were performed, there is no teaching that the claimed data transmitter would be within 6 inches of the data receiver, as required by claim 11. Further, from Cumming Figure 1, it appears that the RF injector probe 20 would be positioned farther than 6 inches away from the fuze. Therefore, Applicants assert that claim 11 is patentable over Cumming in view of Keil, and request that the Board reverse the rejection of claim 11.

Dependent Claim 16

Claim 16 depends from dependent claim 3, discussed above. Claim 16 requires the "reverse transmission" to comprise a "radio signal."

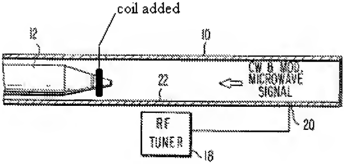
Keil teaches talkback via an inductive signal, and the rejection admits that

Cumming does not teach a talkback signal. See Final Office Action at page 3. Therefore, the applied references do not disclose or suggest a talkback signal sent via a radio signal. Even if the combination proposed in the rejection were performed, the resulting modified fuze would use Keil's inductive talkback method, and would not meet the limitations of claim 16. Therefore, Applicants assert that claim 16 is patentable over Cumming in view of Keil, and request that the Board reverse the rejection of claim 16.

Dependent Claim 17

Claim 17 explicitly requires that the operational power and fuze setting data are transmitted simultaneously.

Applicants have noted potential drawbacks to the modification proposed in the rejection, including an issue of confusing the fuze by transmitting duplicative or redundant information. The subject matter of claim 17 works to strengthen the arguments in certain instances. For example, Applicants have discussed a problem of positioning Keil's inductive coil near the fuze when the fuze is in the barrel in accordance with the Cumming method.



A person of ordinary skill in the art would not be motivated to place an inductive coil over the tip of a projectile fuze while the fuze is chambered in the gun barrel. Further, it is unclear how the coil would be actuated into and out of position.

Applicants request that the Board consider patentability of claim 17 separately, and reverse the rejection of claim 17 under 35 USC § 103.

Issue 2: Whether the Examiner erred in rejecting claims 15, 25 and 26 under 35 USC § 103 over Cumming in view of Keil and further in view of Koerner (US 4495851).

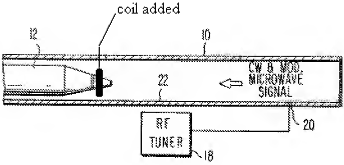
Claims 15, 25 and 26 are dependent claims. Applicants have asserted above under issue 1 that the combination of Cumming and Keil does not present a *prima facie* case of obviousness against any of claims 1-14, 16-18 and 21-24.

Koerner was cited for teaching specific frequency ranges. See Final Office Action at page 5.

Applicants assert that the addition of Koerner does not provide any teaching that would motivate a person of ordinary skill in the art to modify Cumming in view of Keil in a way that would arrive at a device meeting the limitations of any of the pending independent claims. Thus, Applicants assert that dependent claims 15, 25 and 26 are each patentable for at least the reasons asserted with respect to the independent claim from which it depends. Applicants reassert the arguments presented under issue 1 accordingly, and further assert that the addition of Koerner does not provide any motivation to reach the claimed invention.

Applicants further note that claim 15 specifies simultaneous transmission of the operational power and fuze setting data, and that claim 26 specifies simultaneous transmission of the inductive signal and the radio signal.

Applicants have noted potential drawbacks to the modification proposed in the rejection under Issue 1, above, including an issue of confusing the fuze by transmitting duplicative or redundant information. The subject matter of claims 15 and 26 work to strengthen the arguments in certain instances. For example, Applicants have discussed a problem of positioning Keil's inductive coil near the fuze when the fuze is in the barrel in accordance with the Cumming method.



A person of ordinary skill in the art would not be motivated to place an inductive coil over the tip of a projectile fuze while the fuze is chambered in the gun barrel. Further, it is unclear how the coil would be actuated into and out of position.

Accordingly, Applicants request that the Board reverse the rejection of claims 15, 25 and 26 under 35 USC § 103 over Cumming in view of Keil and further in view of Koerner.

Respectfully submitted,

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(viii) Claims Appendix

1. A system for programming a fuze comprising:

a fuze having a power receiver and a data receiver; and

a fuze setter having a power transmitter and a data transmitter;

wherein operational power for the fuze is inductively transmitted from the power transmitter to the power receiver; and pre-launch fuze setting data is transmitted from the data transmitter to the data receiver via an electromagnetic signal selected from a group consisting of the infrared, RF, visible and UV bands of the electromagnetic spectrum.

2. The system of claim 1, wherein the power transmitter comprises an inductive coil and the data transmitter comprises an antenna.

3. The system of claim 1, wherein the fuze comprises a data transmitter having an antenna; the fuze setter comprises a data receiver; and the setting data received by the fuze is verified by a reverse transmission from the fuze data transmitter back to the fuze setter data receiver.

4. The system of claim 1, wherein the data transmitter is within 6 inches of the data receiver.

5. A system for programming a fuze comprising:

a fuze comprising a power receiver and a radio frequency data receiver; and

a fuze setter comprising a power transmitter and a radio frequency data transmitter;

wherein operational power for the fuze is inductively transmitted from the power transmitter to the power receiver, and pre-launch fuze setting data is transmitted from the radio frequency data transmitter and received by the radio frequency data receiver.

6. The system of claim 5, wherein the radio frequency data receiver of the fuze comprises a radio frequency transceiver; and the radio frequency data transmitter of the fuze setter comprises a radio frequency transceiver.

7. The system of claim 6, wherein a talkback signal is sent from the fuze transceiver to the fuze setter transceiver to verify the setting data.

8. The system of claim 5, wherein the fuze setting data is transmitted via a frequency modulated carrier signal.

9. The system of claim 8, wherein the fuze setting data is transmitted using frequency shift keying.

10. The system of claim 5, wherein the power transmitter comprises an inductive coil and the data transmitter comprises an antenna.

11. The system of claim 5, wherein the data transmitter is within 6 inches of the data receiver.

12. The system of claim 5, wherein the data transmitter comprises a level shifter, a modulation circuit and an antenna.

13. The system of claim 12, wherein the level shifter comprises a first digital-to-analog converter and a second digital-to-analog converter, the output of the first digital-to-analog converter having a higher voltage than the output of the second digital-to-analog converter.

14. The system of claim 5, wherein the data receiver comprises an antenna, a modulation circuit and an analog-to-digital converter.

15. The system of claim 1, wherein the operational power and the pre-launch fuze setting data are transmitted simultaneously.

16. The system of claim 3, wherein the reverse transmission comprises a radio signal.

17. The system of claim 5, wherein the operational power and the pre-launch fuze setting data are transmitted simultaneously.

18. The system of claim 5, wherein at least 1,000,000 bits/second is transmitted from the transmitter to the receiver.

21. A method of setting a projectile fuze comprising:

providing a fuze comprising a power receiver and a radio frequency data receiver;

providing a fuze setter comprising a power transmitter and a radio frequency data transmitter, the power transmitter comprising an inductive coil, the radio frequency data transmitter comprising an antenna;

transmitting operational power for the fuze from the power transmitter to the power receiver via an inductive signal; and

transmitting fuze setting data from the radio frequency data transmitter to the radio frequency data receiver via a radio signal.

22. The method of claim 21, wherein the step of transmitting fuze setting data comprises:

modulating a radio frequency carrier signal using frequency shift keying;

transmitting the modulated carrier signal via the radio frequency data transmitter;

receiving the modulated carrier signal via the radio frequency data receiver; and

down converting the modulated carrier signal.

23. The method of claim 21, wherein the step of transmitting operational power is performed for an initial power-up period before the step of transmitting fuze setting data is performed.

24. A system for programming a fuze comprising:

a fuze comprising a power receiver and a data receiver; and

a fuze setter comprising a power transmitter and a data transmitter, the power transmitter comprising an inductive coil;

wherein the power transmitter transmits an inductive power carrier signal and the data transmitter transmits an electromagnetic signal comprising pre-launch fuze setting data, and the data receiver receives the electromagnetic signal.

25. The system of claim 24, wherein the electromagnetic signal has a frequency ranging from greater than 100 kHz to 100 PHz.

26. The method of claim 21, wherein the inductive signal and the radio signal are transmitted simultaneously.

(ix) Evidence Appendix

None.

(x) Related Proceedings Appendix

None.